# SFL-FA-SF-1651-5-CW

## 1600-1750nm Raman fiber amplifier

## Core Parameters

Operating wavelength 1600-1750nm, Output optical power 5W, Beam Quality $M^2$<1.1; Bandwidth >±5nm

## Overview

LD-PD PTE.LTD. has launched a single-frequency Raman fiber amplifier with an ultra-wide wavelength range of 1120-1700 nm, filling the gap in emission wavelengths of rare-earth ion-doped fiber lasers. This series of single-frequency Raman amplifiers, based on Raman amplification technology, boasts a maximum output power of up to 30 W. Its all-polarization-maintaining, all-fiber structure ensures the laser features a compact design, excellent long-term stability, and maintenance-free operation. Meanwhile, it guarantees extremely low intensity noise and phase noise of the output laser. With characteristics such as high power, low-noise amplification, and ultra-fast seed cut-off protection, this amplifier meets the demand for lasers with special wavelengths in applications like laser atomic cooling and laser spectroscopy.

## Features

- High Power
- Narrow Linewidth
- Excellent Beam Quality
- Wide wavelength coverage range
- Low Noise
- Seed Power-off Protection System
- Optical Communication
- Light Detection and Ranging
- Frequency-Doubled Fundamental Frequency Light Source
- Interferometry
- Mid-Infrared Parametric Oscillation Pumping

## Technical Specifications

| Specification | | | |
|---|---|---|---|
| Partnumber | SFL-FA-SF-X-Y-CW(1) | | |
| Range | 1120nm-1340nm | 1340nm-1530nm | 1600nm-1750nm |
| Output Power | >1W/8W/30W | >1W/5W/15W | >1W/5W |
| Typical wavelength | 1315nm, 1389nm, 1651nm | | |
| Bandwidth(2) | >±5nm | | |
| Relative Intensity Noise | <1% (RMS, 10Hz-10MHz Integration) | | |
| Power Stability | <0.75% @3hours, RMS | | |
| Power Tuning Range | 10-100% | | |
| Output Mode | Single Mode PM Fiber with FC/APCconnector（Output Power≤5W)<br>OR Collimated Output | | |
| Beam Diameter | 0.6±0.2mm | | |
| Beam Quality | TEM00，$M^2$<1.1 | | |
| Polarization | Linear, >23dB | | |
| Seed Laser Input Power | >10mW(3) | | |
| Seed Laser Input Isolation | >25dB | | |
| Output Laser Isolation | >25dB | | |
| Cooling | Air Cooling/ Water Cooling | | |

| Operating Environment & Power Supply | |
|---|---|
| Temperature | 15-30 ℃（Air Cooling）OR 15-35 ℃（Water Cooling） |
| Power Supply | 100V-240V, AC, 50/60Hz |
| Communication | RS422 |

**Note:**

(1)X is the center wavelength， Y is the output power, if 15W 1340nm amplifier, the partnumber is SFL-FA-SF-1340-15-CW

(2) Bandwidth can be customized

(3) Default input power should be 10-50mW, for higher or lower input power, please email us for customization

Higher power, more wavelengths, customizable solutions

## Power Spectral Testing

| pumping current（A） | Output power (W) @ 32 mW seed | PD2 feedback value | PD3 feedback value |
|---|---|---|---|
| 8 | 0.01 | 0 | 0 |
| 9 | 0.03 | 0 | 0 |
| 10 | 0.15 | 0 | 0 |
| 11 | 0.7 | 0 | 0 |
| 12 | 3.68 | 22-30 | 233 |
| 13 | 9.95 | 50-102 | 656 |
| 14 | 17.44 | 170-330 | 1230 |
| 15 | 25.4 | 350-540 | 1668 |
| 15.5 | 29.9 | 600-680 | 2040 |
| 15.6 | 30.8 | 700-960 | 2058 |

Table 1. Output power versus current curve

## Spectral Testing

The amplified output delivers 30 W at a central wavelength of 1180.108 nm, with a signal-to-noise ratio of 53 dB.

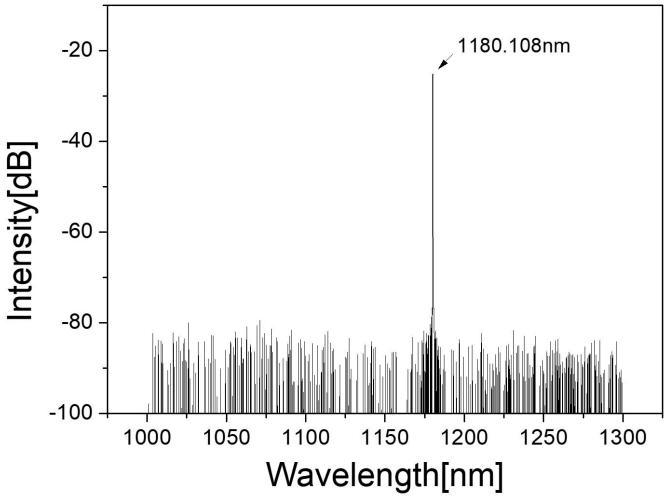


Figure 1. Output spectrum at 30 W power

## Power Stability Testing

The laser has an output power of 30 W, with an RMS power stability of 0.31% over a 2-hour period.

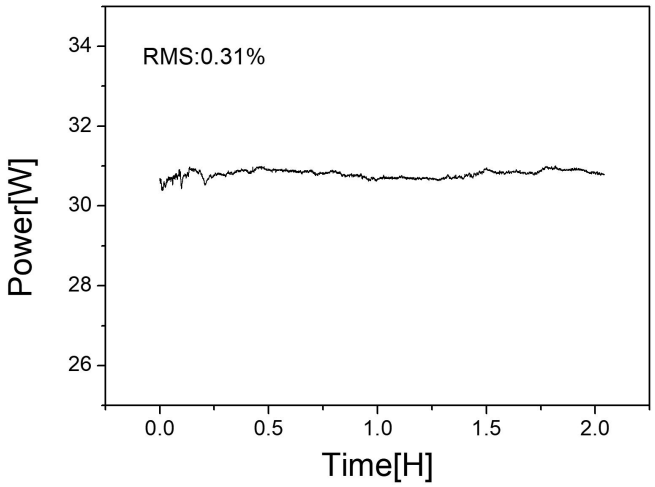


Figure 2. 2-hour output power stability test

## Polarization degree testing

The output laser is linearly polarized light with a polarization degree exceeding 19 dB.

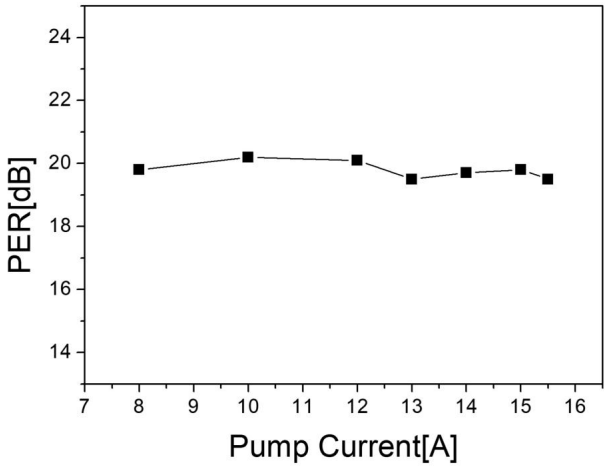


Figure 3. Polarization degree measurement under different pump currents

## Beam quality

The output beam quality measurement yields an M2 value of 1.04. The collimated output spot diameter is approximately 1.5 mm.

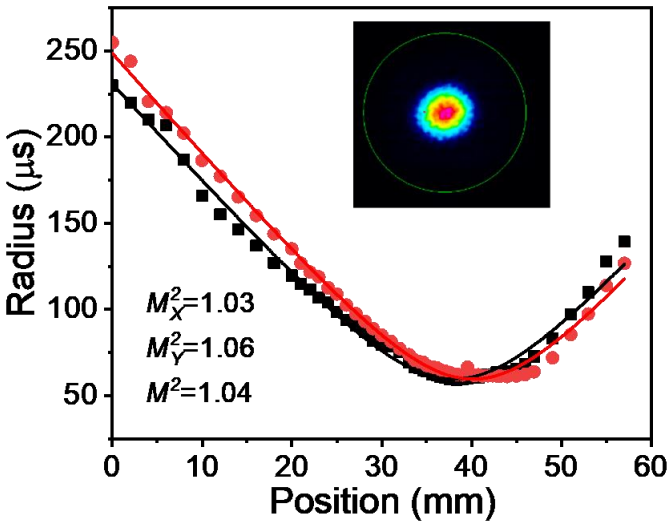


Figure 4. $M^2$ Test

# Line width testing

The seed line width is 111.6 kHz, and the amplified output line width measurement is 116.5 kHz.